

ADM300A(V1) Multi-Function Survey Meter

7065622A

Operator's Manual

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1. INTRODUCTION

1.1 GENERAL INFORMATION

1.1.1 SCOPE

The purpose of this manual is to explain the operation of the ADM300A multi-function system consisting of the ADM300A survey meter and probes. The ADM300A has been packaged with several sets of probes known collectively as ADM300A Kit.

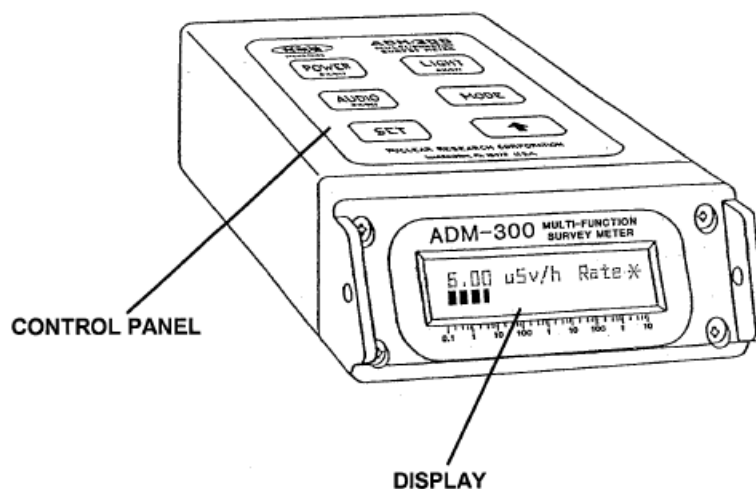
MANUAL TYPE: Operator's manual

MODEL/EQUIPMENT NAME: ADM300A Multi-function survey meter

DESCRIPTION/CAPABILITIES OF EQUIPMENT:

Used to locate and measure radioactivity in the form of gamma rays or beta particles. Displays dose rates and total accumulated dose, resulting from a fallout field.

ADM300A Survey Meter



ADM300A MAJOR COMPONENTS

SURVEY METER Sensors, electronics, controls, indicators, batteries.

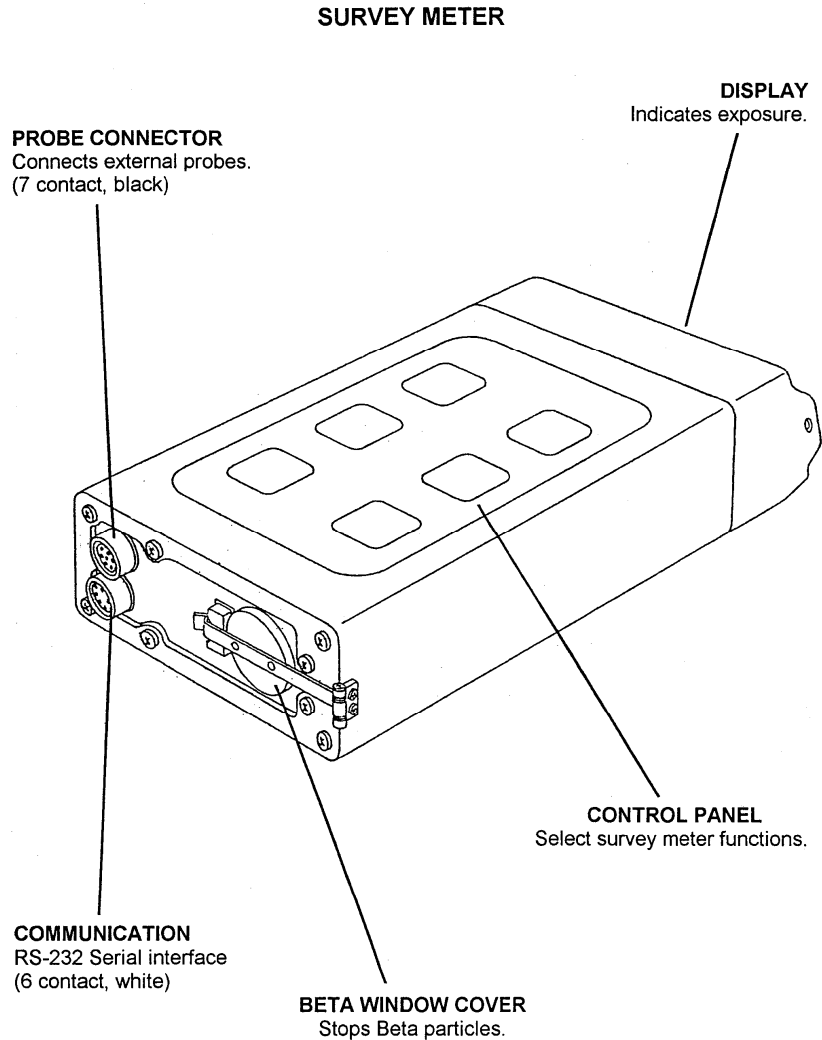
Survey Meter Functions: Sense and display Dose, Dose rate, provide necessary indications.

DISPLAY LCD panel with switchable back light.

Display Functions: Show dose rate, accumulated dose, low batteries condition, alarm set points, test and fault indicators.

CONTROL PANEL Membrane switch panel.

Control Panel Functions: Provide operator's input for normal use and for test of the instrument.



1.1.2 NOMENCLATURE CROSS REFERENCE LIST

Common names are used when the major components of the set are mentioned in this manual.

COMMON NAME	OFFICIAL NOMENCLATURE
ADM300A	Multi function survey meter
Carrying case	Case, ADM300A
Strap	Strap, ADM300A
Rate	Dose Rate

1.1.3 LIST OF ABBREVIATIONS AND ACRONYMS

Acronyms are defined the first time they appear in this manual. A list of abbreviations and acronyms follows.

uSv	micro-Sievert (1 uSv = 0.001mSv)
mSv	milli-Sievert (1mSv = 1000uSv)
mSv/h	milli-Sievert per hour
LCD	Liquid crystal display
G-M	Geiger-Mueller tube
Bq/CMxCM	Becquerel per square centimeter

1.1.4 GLOSSARY

DOSE RATE	An amount of radiation exposure within a given period of time. (mSv/h)
DOSE	A cumulative amount of radiation exposure. (mSv)
DECADE	Range of values 10 times larger or smaller than an adjacent range.
GAMMA RAY	Electromagnetic radiation of high energy and ultra short wavelength (high penetration).
BETA PARTICLES	Negatively charged particles moving at high (low penetration).

X-RAYS

Electromagnetic radiation of high energy having a shorter wavelength than those in the ultraviolet region (low penetration).

AUTO RANGING

The survey meter display will automatically provide the proper readings and units over its entire operating range without the need for mechanical switching or other operator actions.

1.2. EQUIPMENT DESCRIPTION AND DATA

1.2.1 EQUIPMENT CHARACTERISTICS, CAPABILITIES, AND FEATURES

CHARACTERS

- Lightweight
- Easy to use
- Operates from internal replaceable batteries
- AC power source or vehicular power
- Self-testing during operation
- Auto-ranging
- Accepts external probes

CAPABILITIES

- Detects, measures, and digitally displays levels of gamma radiation dose rate from 0.01 uSv/h to 100 Sv/h. The analog display covers 0.01 uSv/h to 10 Sv/h.
- Detects and displays relative level of beta particles.
- Measures, stores, and digitally displays accumulated dose from 0.01 uSv to 100 Sv. The analog display covers 0.01 uSv to 10 Sv.

FEATURES

- Liquid crystal display (LCD) shows three digits, decimal point and unit of measure for dose rate or accumulated dose. Also indicates low batteries and faults.
- External probe attachment for increased and/or remote monitoring.
- Can be vehicle powered and mounted.
- Audible and/or visual alarm independently settable for dose rate and accumulated dose.
- RS-232 Serial computer port.

1.2.2 DESCRIPTION OF EQUIPMENT

ENVIRONMENTAL

The basic ADM300A kit includes:

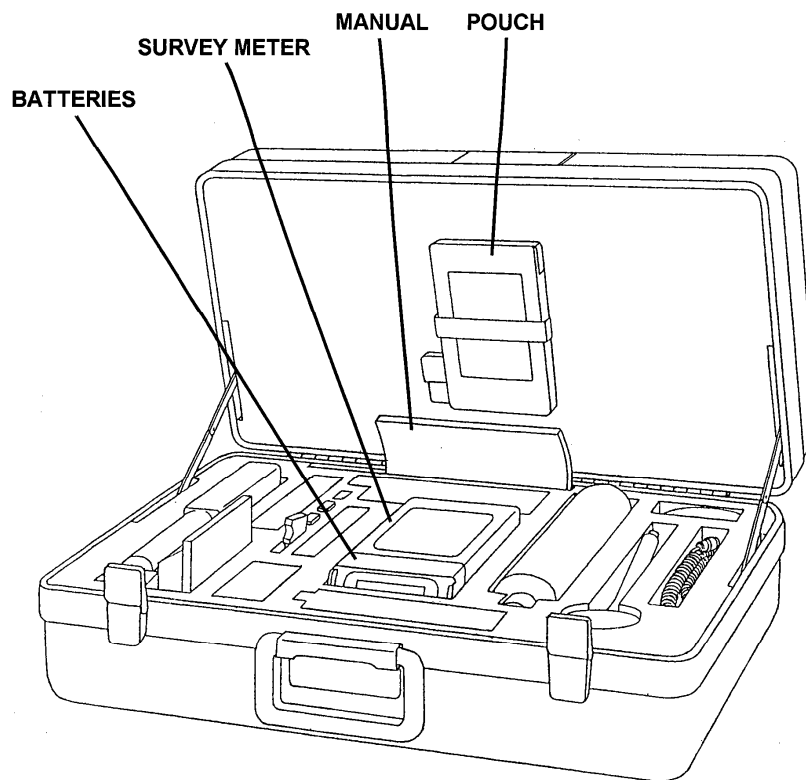
- ADM300A Survey Meter
- Carrying pouch
- Spare batteries
- (optional holder) gun handle

CARRYING CASE

Holds survey meter and accessories during transportation, and stores spare batteries and operation manual.

Strap

Used by operator to shoulder carry ADM300A for field use.



Note: The entire ADM300A kit is shown in a transportation case with the basic ADM300A plus external probes and other accessories.

1.2.3 EQUIPMENT DATA

ENVIRONMENTAL

Altitude transportation:	10,000 Meters
Altitude operating range:	To 15,000 feet (4,572 m) Above sea level
Humidity:	0 to 95%
Operating temperature:	-30 °C to +50 °C
Storage temperature:	-40 °C to +60 °C
Water resistance:	Splash proof & momentary immersion proof

OPERATIONAL

Detectors:	Two G-M detectors (low-range for gamma and beta radiation, high-range only for gamma radiation) located internally, facing the rear panel of the instrument
Range:	
Low-range detector	0.01 uSv/h to 50 mSv/h (Dose rate)
High-range detector	30 mSv/h to 100 Sv/h (Dose rate)

OVER ALL DETECTING RANGE

Dose rate:	0.01 uSv/h to 100 Sv/h for gamma rays. 0.01 uSv/h to 50 Sv/h for Beta radiation.
Accumulated dose:	0.1 uSv to 100 Sv

ACCURACY

Dose rate:	± 15% up to 100 Sv/h.
Dose:	± 15% up to 10 Sv.
Linearity:	± 5%
Response time	Two to five second.

ALARMS	Audio and visual.
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WEIGHTS AND DIMENSIONS (SURVEY METER)

Weight	3 lb (1.36 kg.)
Height	1.88 in. (4.8 cm)
Width	4.38 in. (11. 1 cm)
Length	8.50 in. (21.6 cm)

POWER

Main power (all weather)	9V. Two standard 9 volt batteries (Holder parallels batteries, only one required for operation)
Vehicle power	12 to 24 (when vehicle mounted)
AC Power	Supplies 9 VDC Input: 100 to 240 VAC 50 or 60 Hz
Main Power (battery life)	100 hours typical

2. OPERATING INSTRUCTION

2.1 DESCRIPTION OF CONTROLS AND INDICATORS

2.1.1 EQUIPMENT CONTROLS AND INDICATORS

MEMBRANE SWITCHES

POWER

Turns unit On or Off when pressed for at least *two seconds*.

LIGHT

Turns LCD backlight.
On or Off.

AUDIO

Turns audio On or Off.

MODE

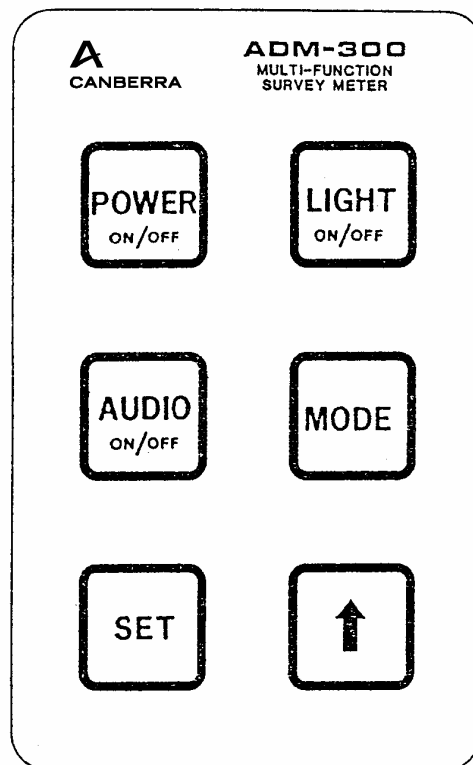
Displays available modes.

SET

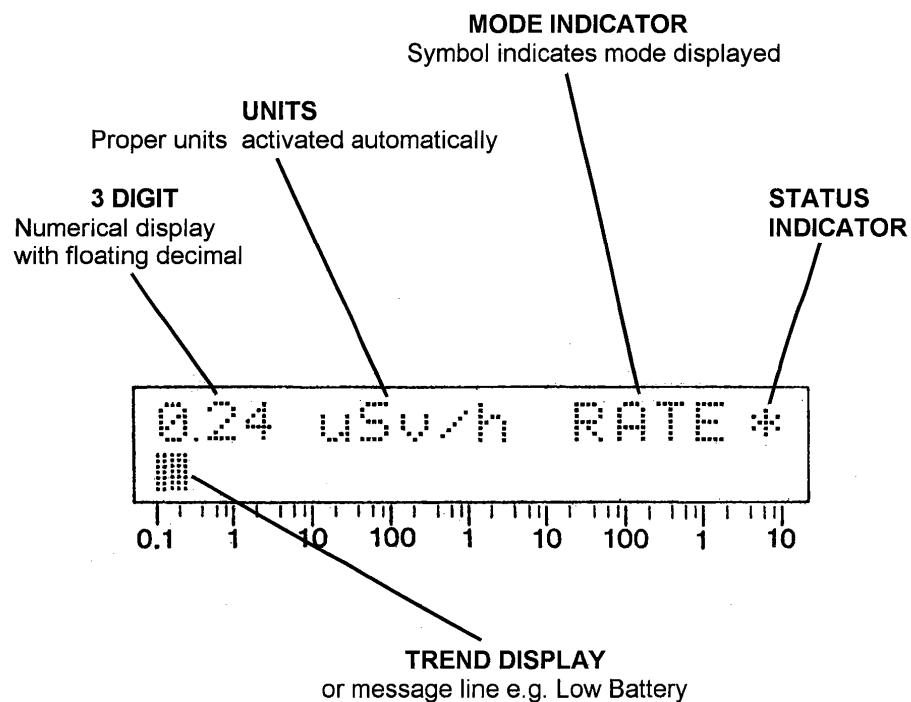
Used to enter modes and adjust alarms set points.

↑:

Called INC for increment. Used to adjust alarm set points and clear dose.



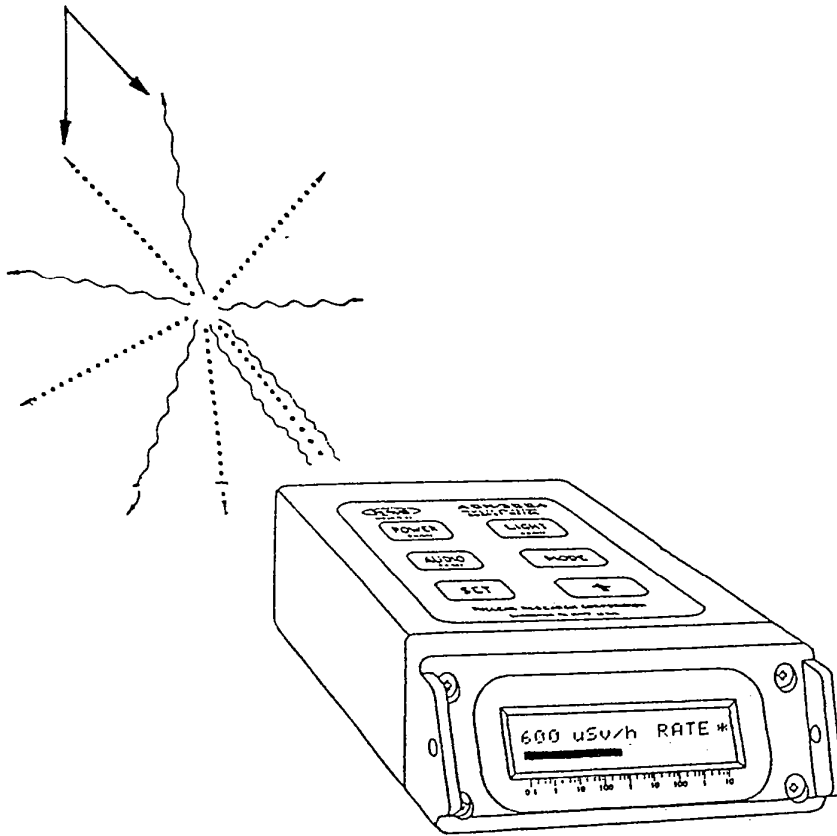
DIGITAL DISPLAY



<u>MODE</u>		<u>STATUS</u>	
<u>OPERATING MODE</u>	<u>MODE INDICATOR</u>	<u>SYSTEM STATUS</u>	<u>STATUS INDICATOR</u>
Dose Rate	Rate	Normal (Audio Enabled)	*
Dose	Dose	Normal (Audio Disabled)	(Blank)
Rate Alarm	RaAlm	Rate Alarm	R (Flashing)
Dose Alarm	DoAlm	Dose Alarm	D (Flashing)
		Both Rate & Dose	B (Flashing)

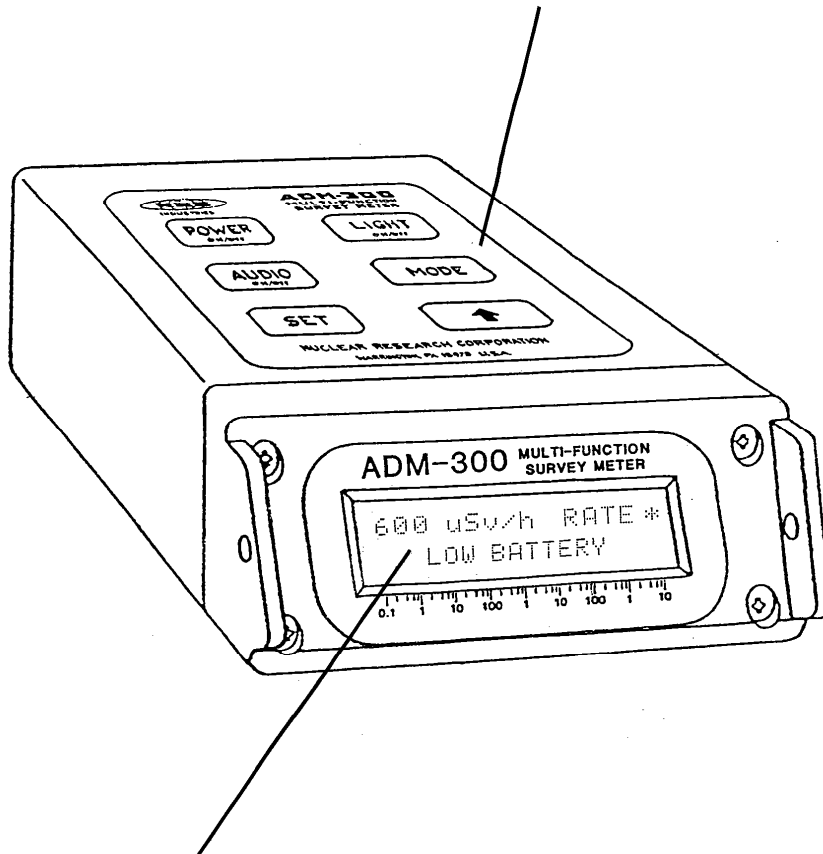
PRINCIPLE OF OPERATION

1. Gamma rays and beta particles from radioactive source travel in all directions.



2. Two G-M detectors in the survey meter produce electrical signals when exposed to gamma rays and beta particles.
3. Survey meter converts signals into dose rates and accumulated dose; activates alarm when preset alarm levels are exceeded.

4. Control panel switches permit operator to set alarm levels for audible or visual display, select display readings and perform equipment tests.



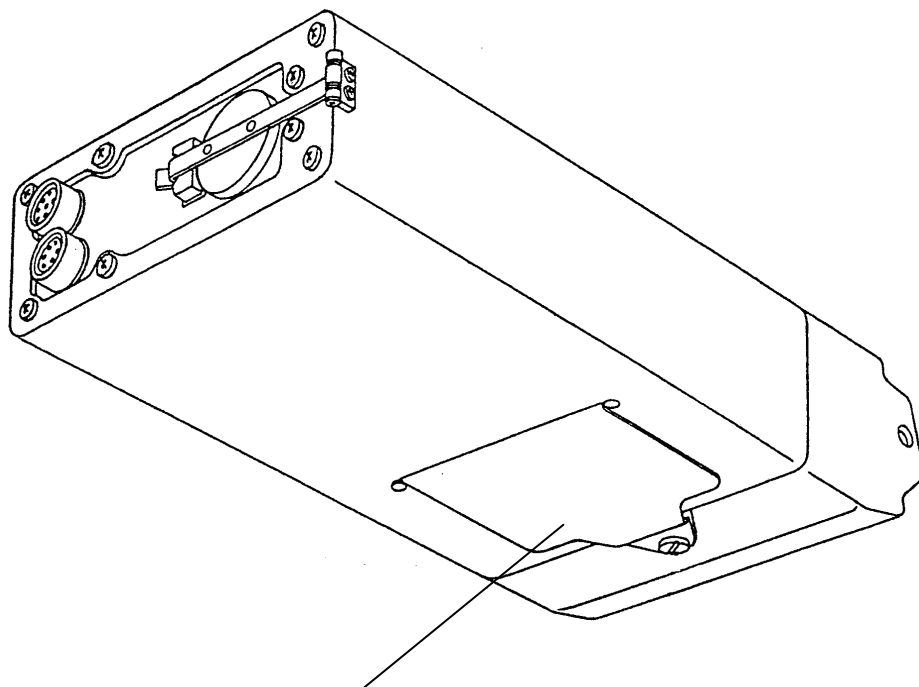
5. Display shows dose rate and accumulated dose values, alarm set levels, battery conditions and test and fault indicators.

2.2 PREPARATION FOR USE

2.2.1 ASSEMBLY AND PREPARATION FOR USE

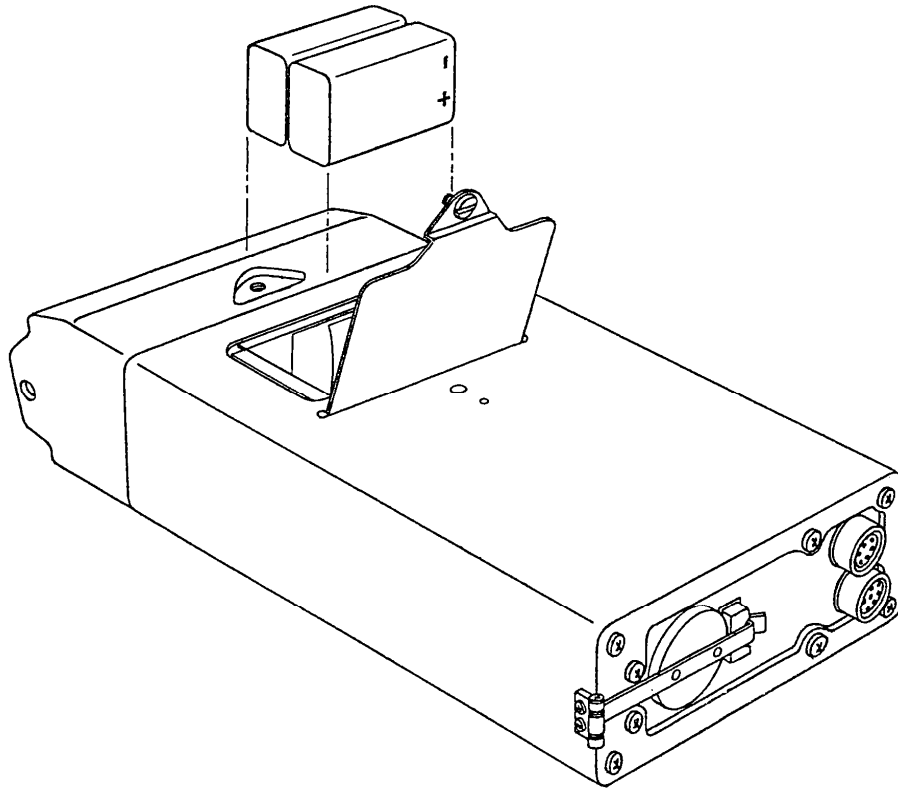
Battery Installation/Replacement

1. Be sure the ADM300A is turned OFF (display blank).



2. Loosen, but do not remove captive screw.

3. Open battery well cover and remove two batteries by pulling on the battery compartment pull tab.



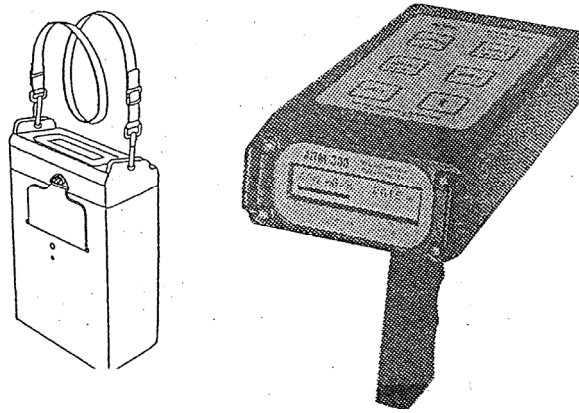
4. With pull tab pushed back into battery compartment, insert new batteries (two) into the battery box using the directional label located inside the battery compartment. Insert positive terminal first as indicated.
5. Replace well cover and tighten captive screw.

CAUTION: DO NOT OVER TIGHTEN.

Note: Only one battery required for operation.

Attach Carrying Strap

Attach the strap clip to the survey meter front panel mounting holes with the spring clips, located at each end of the strap.



Note: Remove the strap when storing the ADM300A in the carrying case.

Attaching the Optional Gun Handle

Place the captive screw of the handle over the tapped hole in the bottom of the instrument such that the handles peg aligns with the round depression in the instrument case.

Start the captive screw into the tapped hole in the case while seeing that the peg fits in the hole. Hand tighten the screw firmly with the knurled screw head.

2.2.2 EQUIPMENT APPLICATIONS

There are three methods used to locate radiological contamination: Surveying, Monitoring, and Ground radiological reconnaissance.

SURVEYING

Surveys are conducted to find the extent and intensity levels of radiological contamination. There are two types, aerial and ground.

Note: To perform aerial surveys, auxiliary equipment is required which is not supplied with the ADM300A.

- Aerial surveys cover a large area faster than other methods. They are more flexible, require fewer personnel and minimize exposure.
- Ground surveys offer a higher degree of accuracy and can be performed in any type of weather and in darkness.

MONITORING

Monitoring is performed to determine the presence and intensity of residual radiation.

- Area monitoring is performed periodically or continuously to provide early warning and useful radiological data.
- Personnel, food, and equipment monitoring is performed to detect beta and low levels of gamma radiation.

GROUND RADIOLOGICAL RECONNAISSANCE (GRR)

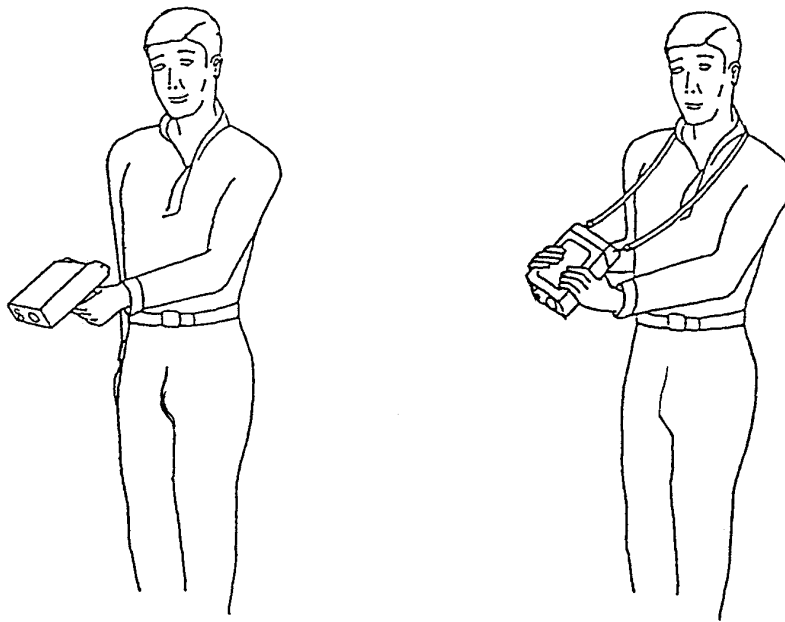
GRR is the process of detecting radiation and measuring it before a unit moves into or through an area.

Note: When the ADM300A is vehicle mounted, a power converter module available to utilize vehicle power.

SURVEY AND MONITORING MODES

In the survey or monitoring modes the operator wears the survey meter using the shoulder carrying strap. The ADM300A must be held in a horizontal position to assure accuracy and uniformity of readings.

If the optional Gun Handle is supplied, the survey meter can be comfortably held while pointing horizontally at areas to be monitored.



GAMMA SURVEY

The beta window cover located on the rear panel of the ADM300A must be closed when measuring gamma radiation. Detection is provided by both low-range and high-range detectors located in the unit. The survey meter auto-ranges from low to high and high to low range of 0.01 $\mu\text{Sv/h}$ to 100 Sv/h smoothly and without interruption.

BETA MONITORING

CAUTION



The beta window can be ruptured by sharp objects. Use extreme care to protect the beta window when the beta window cover is open for monitoring beta radiation.

When monitoring for beta radiation, the unit must be hand held, and the beta window cover must be open and pointed towards the beta radiation to allow beta particles to enter the window of the low range detector. Only the low range detector is capable of detecting beta particles.

2.2.3 OPERATIONAL TEST EXPLANATION

The ADM300A is self testing and the pre-operational tests are performed automatically by the equipment, indicating malfunctions on the display if they occur.

Note: Refer to Chapter 3, Operator Maintenance, for explanation of automatic test performed by the ADM300A. Refer to section 2.2.8, "Automatic Test".

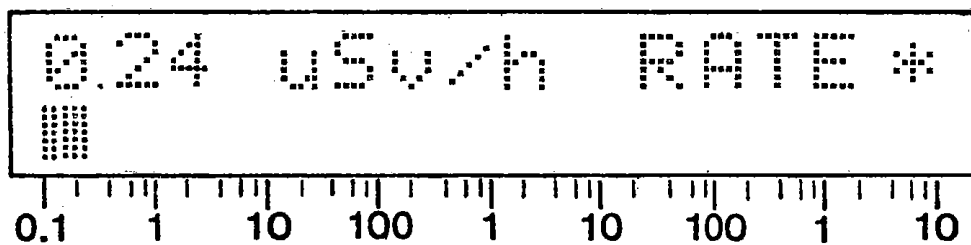
2.2.4 OPERATING PROCEDURES

Turn Unit ON

Press and hold **POWER ON/OFF** switch for *two seconds* to turn unit ON.

The display indicates "PLEASE WAIT" and then conducts a automatic test. On successful completion of the self-test, the RATE display will appear and ambient gamma dose rates will be indicated. The ADM300A updates the display every two seconds.

Note: A "Backup RAM Error" message will be indicated if the ADM300A has been stored with the batteries removed. The default alarm values will be installed. The accumulated Dose is unaffected.



Sample Rate Display

Note: The bar scale is displayed for the eight decades only. This scale is useful only in the observation of quick trends of radiation intensity and is not suited for accurate readings. The digital scale should be used for accurate readings.

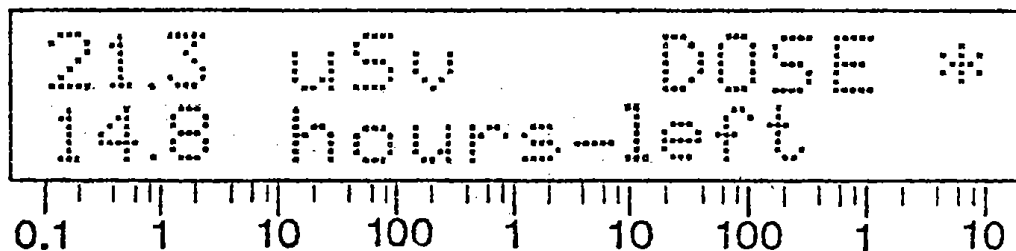
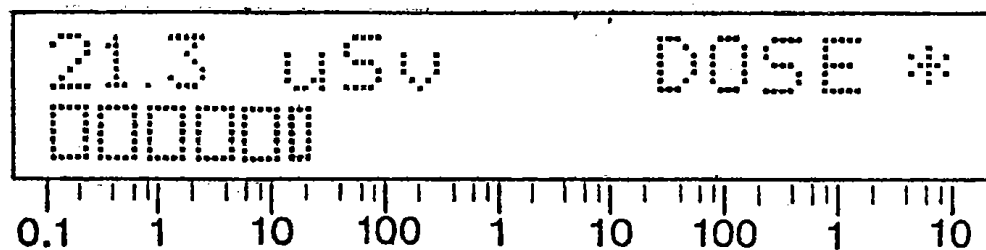
ILLUMINATE DISPLAY

CAUTION: Use of the display light will drain the batteries.

With the unit is turned ON, press and release the **LIGHT ON/OFF** switch to turn the display back light ON or OFF. The back light is turned off automatically after two minutes to preserve battery life.

DISPLAY ACCUMULATED DOSE

Press and release the MODE switch as often as necessary until "DOSE" is displayed. The value shown is the total accumulated Dose since the dose was last reset/zeroed. In the DOSE display mode, the bottom line will indicate (flash) the time remaining at the current dose rate until the dose alarm set point is exceeded if that time is less than 24 hours.



(Example: 100uSv Dose Alarm Set point in a 5.3 uSv/h Field)

Sample Accumulated Dose Displays

DISPLAY ALARM SET POINTS

To see the current Alarm Set Points, press and release the MODE switch until "RaAlm" (Rate Alarm) or "DoAlm" (Dose Alarm) is displayed. For RaAlm, the displayed Rate Alarm point reading will flash several times and then the display will return to Rate display. For DoAlm, the flashing Dose Alarm setting will similarly change to the Rate display.

Only when the instrument is first powered ON after the batteries are removed for a period longer than a few minutes, default setting for rate and dose alarm are installed. This rate alarm point is 6 uSv/h and the dose alarm point is 1 mSv.

Power OFF and ON actions will not affect the last alarm point settings. With the batteries installed, the unit's memory will retain the last set values, even with the power OFF.

If the batteries are removed for more than several minutes, a battery backed RAM error will be displayed and the default alarm settings will be reinstalled.

Note: Dose is not stored in volatile memory and will not be lost.

ADJUST ALARM SET POINTS

To change the alarm set points, select the desired RaAlm (Rate Alarm) or DoAlm (Dose Alarm) display.

Before the display stops flashing, press and release the SET switch. The measurement unit (ex: uSv) will now flash. Successive depressions of the "up arrow" will change the measurement unit through ten decade steps. Stop the switch depressions when the desired decade is displayed.

Each of the three numerical digits in the display can now be individually changed or accepted. Pressing the SET switch, the high order digit in the display starts flashing. This digit can be changed if desired, by successive depressions of the "up arrow". When the desired number is reached, it is accepted by depressing the SET switch. This action also shifts the selection process to the next digit position, where the same process allows setting this digit to the desired value. The third digit can also be set in the same manner.

When all digits have been entered, the display returns to the display of Rate.

The new (if changed) values of alarm points can be verified by pressing the MODE switch until the alarm values are displayed.

RESET / ZERO ACCUMULATED DOSE

To reset Accumulated Dose, press and release the MODE button until DOSE is displayed. Next, press and hold SET. While holding SET, press and hold INC (up arrow) for at least three seconds. The reading will begin to flash, then “Clear Dose” will be displayed. The Dose value will reset to zero, and the “Clear Dose” display will disappear. Release all switches.

SET / ENABLE AUDIO

Press the AUDIO switch to turn this function ON and OFF. The ON state provides audible count signals and audible alarms for both Dose and Dose Rate. The ON state is indicated by a displayed asterisk (*).

Note: When the unit is powered on initially, the sounder will only emit an audible tone when an alarm set point is exceeded. Individual counts or “clicks” will not be heard until the sounder is disabled and re-enabled.

ALARM DISPLAY

When the survey meter has detected radiation above the alarm levels that were set, an audible and a flashing visual alarm are produced. Alarm levels for accumulated Dose and for Dose Rate are independently detected. The display shows the type of alarm, which can be:

R = RATE ALARM

D = DOSE ALARM

B = BOTH RATE & DOSE ALARMS

The audible alarm will not sound if the Audio function is disabled.

Note: Alarm indicators are latched and will continue to be displayed until the alarm condition disappears *and* the alarm is acknowledge by the operator pressing any button (except power).

SURVEY MODE

The ADM300A survey meter can be used to make multiple survey entries and view these entries later or down load them to a computer using the ADMCOM software package. The survey mode is only available with the ADM300A alone or when it has an external probe that reads in dose rate not count rate. For example, the external gamma probe and neutron probe have survey mode available.

In the Survey mode, the ADM300A measures the average dose rate. The period over which the average is measured depends on the field present with a maximum period of two minutes. The Survey average is halted after 440 counts have been recorded. This sample allow for a statistical accuracy of better then +/- 10% true rate with 95% confidence level. This feature allows for accurate surveys to be recorded in higher dose rate fields while minimizing exposure to the survey personnel.

SCALER MODE

The Scaler mode provides a summing function for count rate probes over a user selectable period. This allows accurate objective recording to be made of samples without any mental averaging of displayed count rates by the operator. For example, if smear samples from a suspected contaminated area are to evaluated, a one minute scaler could be made of each smear sample.

TURNING THE UNIT OFF

Press and hold POWER ON/OFF switch for *two seconds* to turn the unit OFF.

Note: When the survey meter is turned OFF, the previously set alarm values are unaffected, and are restored unchanged when the power is turned ON.

STORAGE

Remove accessories such as handle, carrying strap, and probe cable from ADM300A. Remove batteries from ADM300A if unit will be inactive for more than a month. Place all units and accessories in the carrying case.

2.2.5 OPERATION IN HARSH WEATHER

Characters on the display will form at a slower rate in temperatures below -10°C . The survey meter automatically compensates for this delay by sensing temperatures below -10°C . and reducing the display refresh time from every two seconds to every five seconds. Operation of the set is normal otherwise.

2.2.6 EXTERNAL PROBE OPERATION

External probes for Alpha, Beta, Gamma, X-ray, and Neutron monitoring are available. Each external probe is configured such that during power-up of the survey meter, the type of probe is recognized electronically by the survey meter. The ADM300A provides power to operate the probe.

External probes are connected to the survey meter through the 7-pin connector on the back panel while the ADM300A is turned OFF.

The survey meter *must* be turned OFF before connecting the external probe to the survey meter. After connection, when the survey meter is turned ON, the meter automatically gets all the necessary configuration and calibration data from the probe. Since each probe contains its own calibration information, any probe can be used with any ADM300A and maintain its calibration.

The up arrow (↑) INC button is used to switch the rate display to other available units or the ADM300A internal GM tube dose rate. Note Rate Alarm and other functions are not available for all probes. Refer to the function flow diagram for each external probe at the back of this manual for available displays and monitors.

ALPHA PROBE, AP100A / AP100H /MD35

1. With the survey meter turned OFF, connect the probe cable to the 7-pin connector on the probe and the other end of the cable to the ADM300A 7-pin connector.
2. Turn the survey meter power ON. The unit displays “Please Wait” then “ALPHA PROBE” and units of measurement appear. The unit automatically begins to measure Alpha radiation.

Note: If the unit does not indicate probe is attached or if a light leak in the Mylar window is suspected, refer to Chapter 3, *Operator Maintenance*, for trouble shooting procedures.

3. To monitor Alpha radiation remove the protective cover, place the probe window toward the contamination source.
4. Two units of alpha measurement are available:
0.000 cps (counts per second).
0.000 Bq/CM x CM (Becquerel per square centimeter)

Press INC (↑) to sequentially select from alpha rates or gamma rate.

Refer to the Alpha probe's functional flow diagram at the back of the manual for available modes.

5. Press and release AUDIO to activate the sounder as desired.
6. Turn off ADM300A, replace protective cover, and disconnect probe.

BETA PROBE, BP100 and BP110

1. With the survey meter turned OFF, connect the probe cable to the 7-pin connector on the probe and the other end of the cable to the ADM300A 7-pin connector.
2. Turn the survey meter power ON. The unit displays "Please Wait", "BETA PROBE", then displays units of measurement. The unit automatically begins to measure Beta radiation.

Note: If the unit does not indicate probe is attached, refer to Chapter 3, Operator Maintenance, for trouble shooting procedures.

3. To monitor Beta radiation, point the probe window toward the contamination source.
4. The Beta Probe provides automatic background Gamma compensation by means of the ADM300A's internal low-range G-M tube.
5. Gamma compensation can be de-activated. Press and release the INC (↑) switch until "B+G" is displayed to show that both Beta and Gamma are being counted. Press and release INC until Beta is displayed to reactivate Gamma compensation.

Refer to the Beta probe's functional flow diagram at the back of the manual for available modes.

6. Press and release AUDIO to activate the sounder as desired.
7. Turn off ADM300A and disconnect probe.

BETA/GAMMA PROBE, BGP100

1. With the survey meter turned OFF, connect the probe cable to the 7-pin connector on the probe and the other end of the cable to the ADM300A 7-pin connector.
2. Turn the survey meter power ON. The unit displays "Please Wait", then units of measurement. "RaGm" (Rate Gamma) is shown in place of the usual "Rate" to indicate that an external gamma probe is attached.

Note: If the unit does not indicate probe is attached, refer to Chapter 3, Operator Maintenance, for trouble shooting procedures.

The unit begins to monitor Gamma radiation using the external probe.

The two internal G-M tubes are de-activated in this configuration. Refer to the Gamma probe's functional flow diagram at the back of the manual for available modes.

3. Press and release AUDIO to activate the sounder as desired.

4. Turn off ADM300A and disconnect probe.

NEUTRON PROBE, NP100

1. With the survey meter turned OFF, connect the probe cable to the 7-pin connector on the probe and the other end of the cable to the ADM300A 7-pin connector.
2. Turn the survey meter power ON. The unit displays “Please Wait”, “Neutron Probe”, then display units of measurement.

Note: If the unit does not indicate probe is attached, refer to Chapter 3, Operator Maintenance, for trouble shooting procedures.

The unit begins to measure Neutron radiation.

Refer to the Neutron probe's functional flow diagram at the back of the manual for available modes.

3. Press and release AUDIO to activate the sounder as desired.
4. Turn off ADM300A and disconnect probe.

X-RAY PROBE, XP100

1. With the survey meter turned OFF, connect the probe cable to the 7-pin connector on the probe and the other end of the cable to the ADM300A 7-pin connector.
2. Turn the survey meter power ON. The unit displays “Please Wait”, “X-RAY probe”, then units of measurement.

Note: If the unit does not indicate probe is attached, refer to Chapter 3, Operator Maintenance, for trouble shooting procedures.

Refer to the X-ray probe's functional flow diagram at the back of the manual for available modes.

3. To monitor X-ray radiation, point the probe window toward the suspected source.
4. Press and release AUDIO to activate the sounder as desired.
5. Turn off ADM300A and disconnect probe.

X-ray PROBE, XP100

1. With the survey meter turned OFF, connect the probe cable to the 7-pin connector on the probe and the other end of the cable to the ADM300A 7-pin connector.
2. Turn the survey meter power ON. The unit displays “Please Wait” then “X-RAY probe”, then units of measurement.

Note: If the unit does not indicate probe is attached, refer to Chapter 3, Operator Maintenance, for trouble shooting procedures.

Refer to the X-ray probe's functional flow diagram at the back of the manual for available modes.

3. To monitor X-ray radiation, adjust the handle so that the distance from the bottom of the surface to be survey is 12 inches. Remove the protective cover from the probe window.
4. The probe has a background subtract feature. The display count rate can be toggled between gross count rate, "X-ray", and net (background subtraction adjusted rate), "X_NET". To toggle between the rates, press and hold the SET switch, then press the INC (↑) button. Release buttons.
5. The background rate being subtracted can be viewed in the Scaler Mode. To view entered background rate, press and release MODE until the "To enter Scaler" message appears. Then press and release SET. The top line will indicate "cps BackG" for counts per second background.
6. A new background rate can be entered by pressing the INC (↑) button in the Scaler mode when the "INC-> No BackGr" appears and take a scaler reading. After the scaler is completed, the option to save the new background is available by pressing INC.

Note: Background readings and entries should be made in uncontaminated areas. For statistical accuracy, scaler periods should be long enough such that at least 1000 counts were recorded.

7. Press and release AUDIO to activate the sounder as desired.
8. Turn off ADM300A, replace the protective cover, and disconnect probe.

2.2.7 ALTERNATE POWER SOURCES

Batteries in the battery case are the normal source of power for the Survey Meter and its accessories. Alternate power sources are available. They are:

1. Instead of the batteries, the Survey Meter can receive power from CV100 converter which is plugged into a 120 V ac outlet. With the batteries removed from the battery case of the meter, this converter's output provides power to the Meter via a connector that mates with the communication port.
2. Another converter module, this one for vehicular use, is also available. This module operates on input of 12 to 24 V dc and provides the 9 V dc needed by the Survey Meter. It connects to the Meter as described in step "1" above.

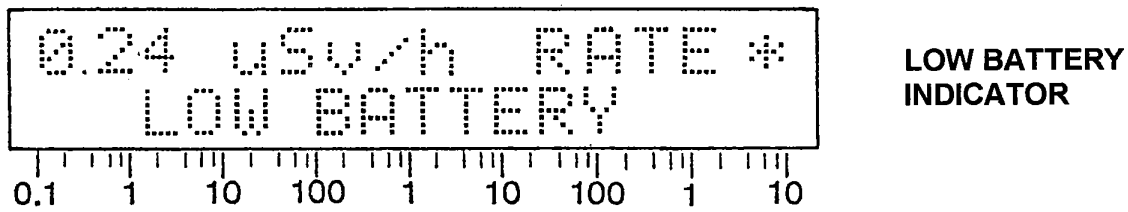
2.2.8 AUTOMATIC TEST

SELF-TEST

The ADM300A is self tested continuously during operation. The tests include main battery condition, counting and timing sequences, internal circuitry, voltage and detectors. During power on sequencing, the ADM300A will check its RAM and EPROM memories. A “Backup RAM error” is expected if the batteries have been removed. This is a non-critical message. However, alarm set points will have to be reset if the default values are not desired.

LOW BATTERY INDICATOR

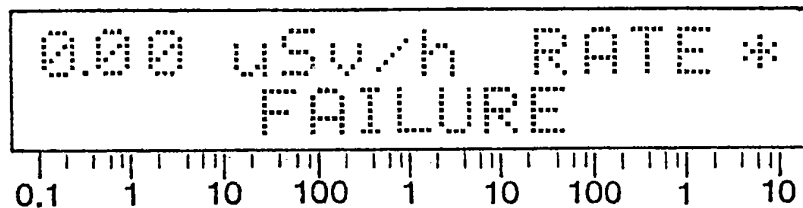
If testing detects a low battery condition, the message line display indicates “LOW BATTERY”. From the time of the initial indication of a low battery, approximately ten hours of useful battery life remain.



Note: When LOW BATTERY is displayed, use the “LIGHT” as little as possible and replace the batteries at the first opportunity (see section 2.2.1, Assembly and Preparation for Use - Battery Installation/Replacement).

GENERAL FAULT INDICATOR

To indicate problems other than low batteries discovered during automatic testing, the general fault indicator (FAILURE) is displayed.



If the ADM300A displays the failure indicator during operation, immediately turn the unit OFF and return to maintenance for repair.

DELAYED GENERAL FAULT INDICATOR

For low-range detector failure, the general fault indicator (FAILURE LOW RANGE) is displayed. In the event of any “Failure” display, turn the unit OFF and have the unit returned to maintenance.

2.3 PREVENTIVE MAINTENANCE

2.3.1 PREVENTIVE MAINTENANCE

Preventive maintenance consists of routine checks of the equipment before and after each mission and every 180 days. Routine checks include cleaning, dusting, and storing items not in use.

Problems requiring maintenance discovered during routine checks should be referred to maintenance.

2.3.2 ROUTINE MAINTENANCE CHECKS

- Ensure batteries are removed.
- Check membrane switch for cracks and breaks.
- Check ADM300A probe and communications connectors to insure that contacts are free of foreign material.
- Check probe cable connectors to insure that pins are straight and free of foreign material.
- Check the beta window for damage, holes, dirt, and moisture.
- Remove dust, moisture and loose dirt from the outside surfaces of the ADM300A with a clean soft cloth.
- Check for broken display window.
- Inspect the battery well gasket for damage. Replace as required.
- Inspect the battery contacts. Remove any corrosion, using a pencil eraser.

CAUTION: The ADM300A Beta window cover should be in its closed position before placing in carrying case.

- Check carrying strap for cracks and breaks.
- Check all probes to insure that connector contacts are free of foreign material.
- Remove grease, fungus, and ground-in dirt from the carrying case.
- Check EM-100 connector pins and ear piece to insure that pins are straight and free of foreign material.

3. OPERATION MAINTENANCE

3.1 TROUBLESHOOTING PROCEDURES

In the event that a problem occurs during the operation of the ADM300A, the following list of symptoms and corrective actions should be observed:

1. Display is blank when unit is turned ON. Install new batteries (section 2.2.1, Assembly and Preparation for Use - Battery Installation/Replacement).
2. Improper or no alarm indications during normal operation. Check and/or reset alarm points.
3. Display alternates between high and low reading.

Two possible causes: Defective high-range tube or the Beta cover is open and the low-range tube is responding to Beta radiation in excess of 50 mSv/h. This is a normal condition.

Note: The high-range tube is not sensitive to Beta radiation and in the second condition above, the low-range tube is receiving radiation above its rated value.

When the display alternates between high and low, the operator should close the Beta shield if it is open. The alternating condition should stop. If it continues, the high-range tube is defective. In this event, the ADM300A set should be referred to maintenance.

4. ADM300A fails to recognize external probe. Make sure that ADM300A is turned OFF before probe was attached. Inspect connectors for foreign material and make sure cable pins are straight.

If fault remains, try connecting another probe, if available, to the ADM300A. If no fault is observed, return original probe to maintenance. If a fault still exists, try another probe cable, if available.

The inspections, tests, and corrective actions listed should be performed. If normal operation cannot be restored, or if the observed malfunction symptom is not on the list, return for maintenance.

4. PERFORMANCE TEST

4.1 SYSTEM CHECK

The ADM300A survey meters and probes, if available, should be checked prior to use and every 180 days for accuracy to assure maximum confidence levels and preparedness.

4.1.1 ACCURACY VERIFICATION PROCEDURE

Equipment requirement:

- TS-100 Test Sources
Consisting of container, Cs-137 button source, and Th-232 fixture.
Please verify the Cs-137 source serial number matches that on the test source container lid.
- GCF-200 Test Fixture

4.1.2 ADM300A VERIFICATION PROCEDURE

1. Prepare the GCF-200 Test Fixture by inserting the Cs-137 source face-up in the circular inset indicated for testing the ADM300A.
2. Refer to the illustration in on the following page and/or source container lid and place the ADM300A Survey Meter in position on the test fixture as shown.
3. Turn the ADM300A ON and verify that Rate is displayed. Observe the displayed Rate reading.
4. Observe that the displayed rate reading is between the upper and lower limits listed for the current year and correct probe/unit on the expected readings label on the inside lid of the TS-100 container.
5. If the reading is not within the indicated limits, repeat steps 1 - 4. If the reading still fails to fall within the listed limits, return unit to maintenance.
6. Turn ADM300A off and return Cs-137 source to the TS-100 container.

4.1.3 AP100A VERIFICATION PROCEDURE

1. Remove the Thorium-232 fixture from the TS-100 test source container. Close and move the TS-100 with the Cs-137 button a few feet away.
2. With the ADM300A turned OFF, attach the AP100A and turn ON the ADM300A. Remove the protective cover from the AP100A window.
3. Refer to the illustration on the following page and/or Th-232 source fixture, and place the Th-232 fixture in position on the AP100A window as shown. Make sure that the Th-232 source is facing the AP100A window.
4. Observe that the displayed rate reading is between the upper and lower limits listed for the current year and correct probe in the expected readings column on the Th-232 fixture label.
5. If the reading is not within the indicated limits, repeat steps 1 – 4. If the reading still fails to fall within the listed limits, return unit to maintenance.
6. Turn ADM300A off, replace the AP100A protective cover, disconnect the AP100A, and return the Th-232 source to the TS-100 container.

4.1.4 BP100 VERIFICATION PROCEDURE

1. Prepare the GCF-200 Test Fixture by inserting the Cs-137 source face-up in the circular inset indicated for testing the BP100.
2. Refer to illustration on the following page and/or source container lid and place the BP100 in position on the test fixture as shown.
3. Turn the ADM300A ON. Press and release INC (↑) until B+G is displayed. Observe the displayed Rate reading.
4. Observe that the displayed rate reading is between the upper and lower limits listed for the current year and correct probe/unit on the expected readings label on the inside lid of the TS100 container.
6. If the reading is not within the indicated limits, repeat steps 1 - 4. If the reading still fails to fall within the listed limits, return unit to maintenance.
7. Turn ADM300A off, disconnect the BP100, and return Cs-137 source to the TS-100 container.

4.1.5 BGP100 VERIFICATION PROCEDURE

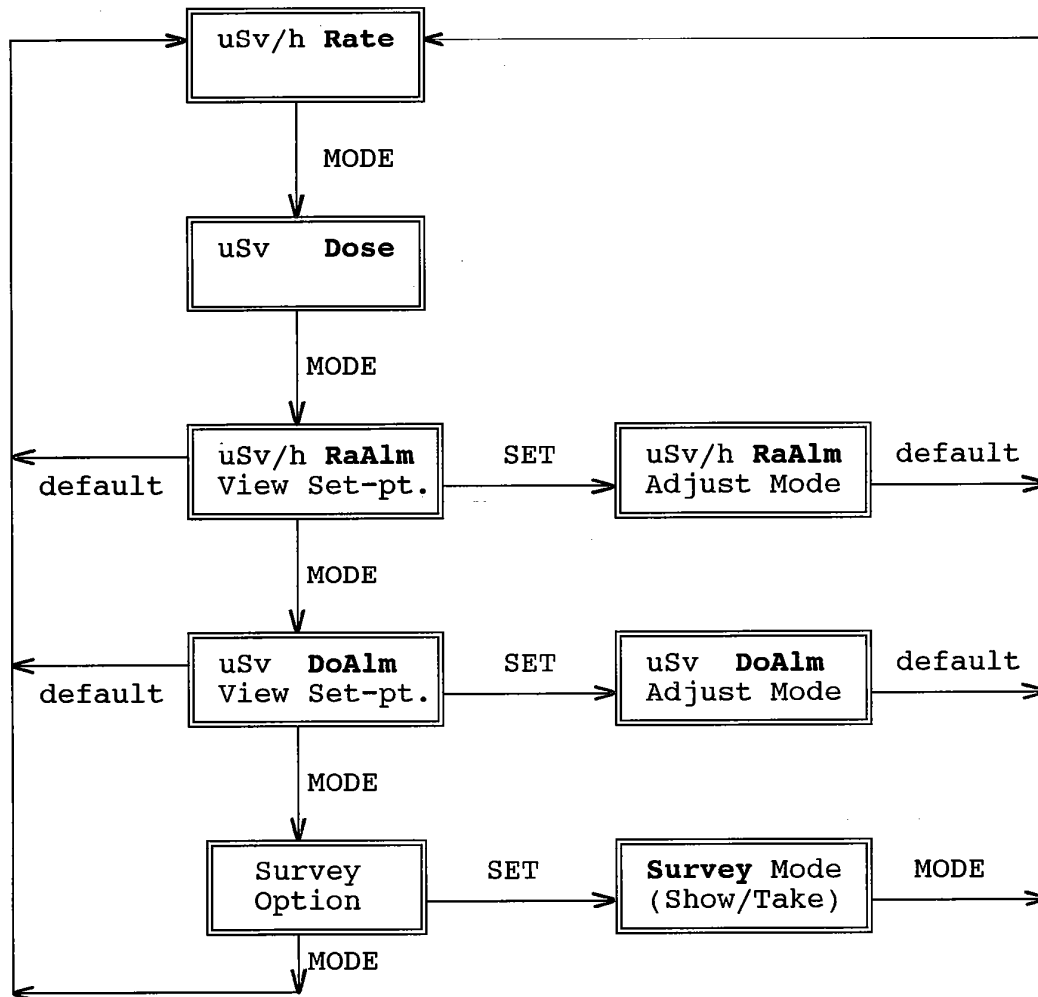
1. Prepare the GCF-200 Test Fixture by inserting the Cs-137 source face-up in the circular inset indicated for testing the BGP100.
2. Refer to illustration on the following page and/or source container lid, and place the BGP100 in position on the test fixture as shown.
3. Turn the ADM300A ON and verify that RaGm is indicated for external gamma probe rate. Observe the displayed rate reading.
4. Observe that the displayed rate reading is between the upper and lower limits listed for the current year and correct probe/unit on the expected readings label on the inside lid of the TS100 container.
5. If the reading is not within the indicated limits, repeat steps 1 - 4. If the reading still fails to fall within the listed limits, return unit to maintenance.
6. Turn ADM300A off, disconnect the BGP100, and return Cs-137 source to the TS-100 container.

4.1.6 XP100 VERIFICATION PROCEDURE

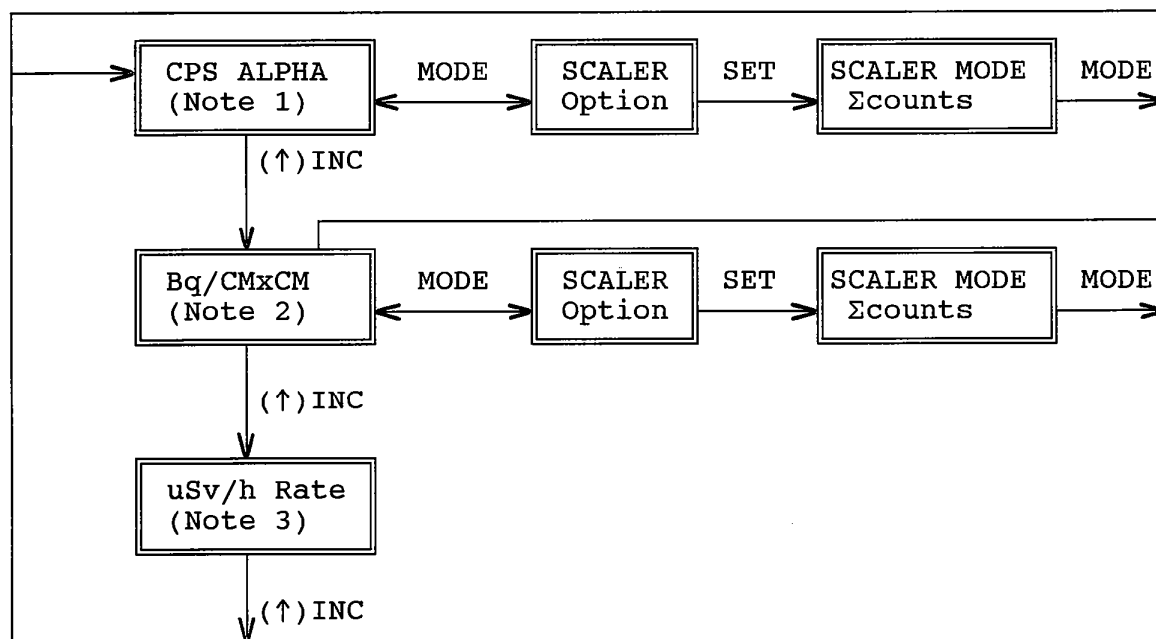
1. Remove the Th-232 fixture from the TS-100 test source container. Close and move the TS-100 with Cs-137 button a few feet away.
2. With the ADM300A turned OFF attach the XP100 and turn on the ADM300A.
3. Refer to illustration on the following page and/or TH-232 source fixture, and place the XP100 on Th-232 fixture in the circle indicated. The XP100 probe face should be flat against the source.
4. Observe that the displayed rate reading is between the upper and lower limits listed for the current year and correct probe in the expected readings column on the Th-232 fixture label.
5. If the reading is not within the indicated limits, repeat steps 1 - 4. If the reading still fails to fall within the listed limits, return unit to maintenance.
6. Turn ADM300A off, disconnect the XP100, and return Th-232 source to the TS-100 container.

ADM-300A (V1A) Software Description & Flow Diagrams

ADM-300A (V1A) stand-alone:



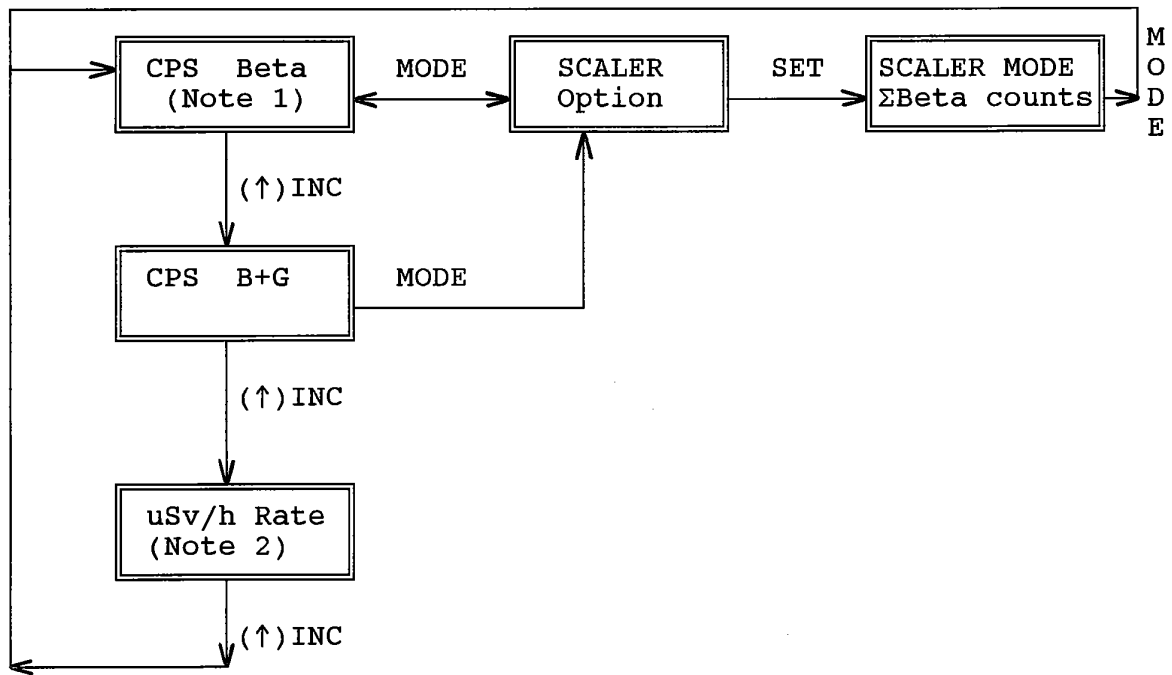
Alpha Probe:



Notes:

- 1: True counts per second, not probe efficiency adjusted.
- 2: Becquerel per square centimeter, not per 100 square centimeter.
- 3: ADM-300A GM tube reading, low range GM tube only.

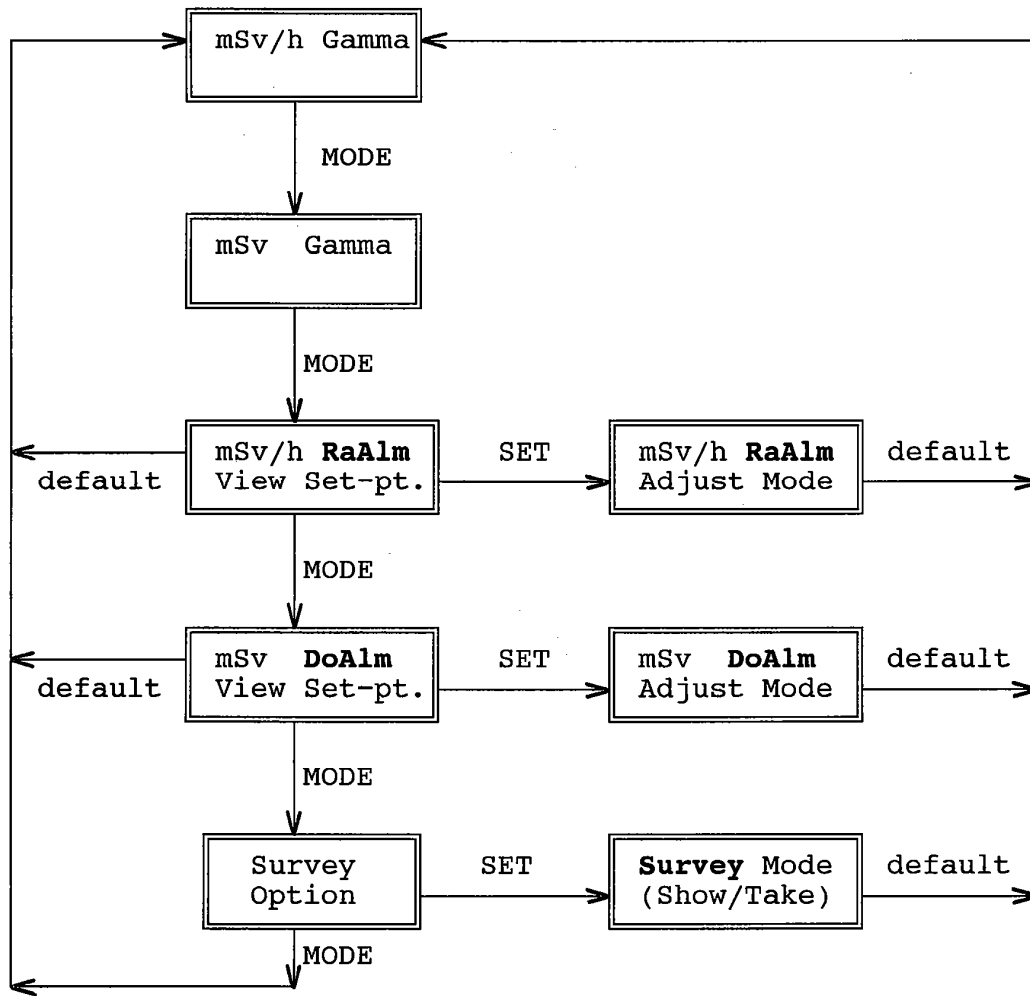
Beta Probe:



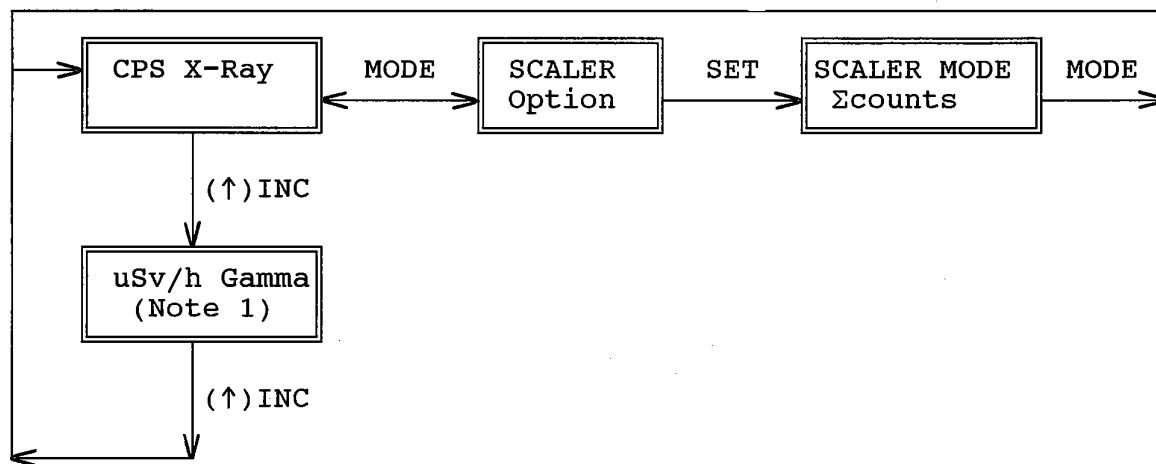
Notes:

- 1: Beta rate derived from (B+G) - K(int. GM).
- 2: ADM-300A GM tube reading, low range GM tube only.

BGP-100 & Gamma Probe(s):

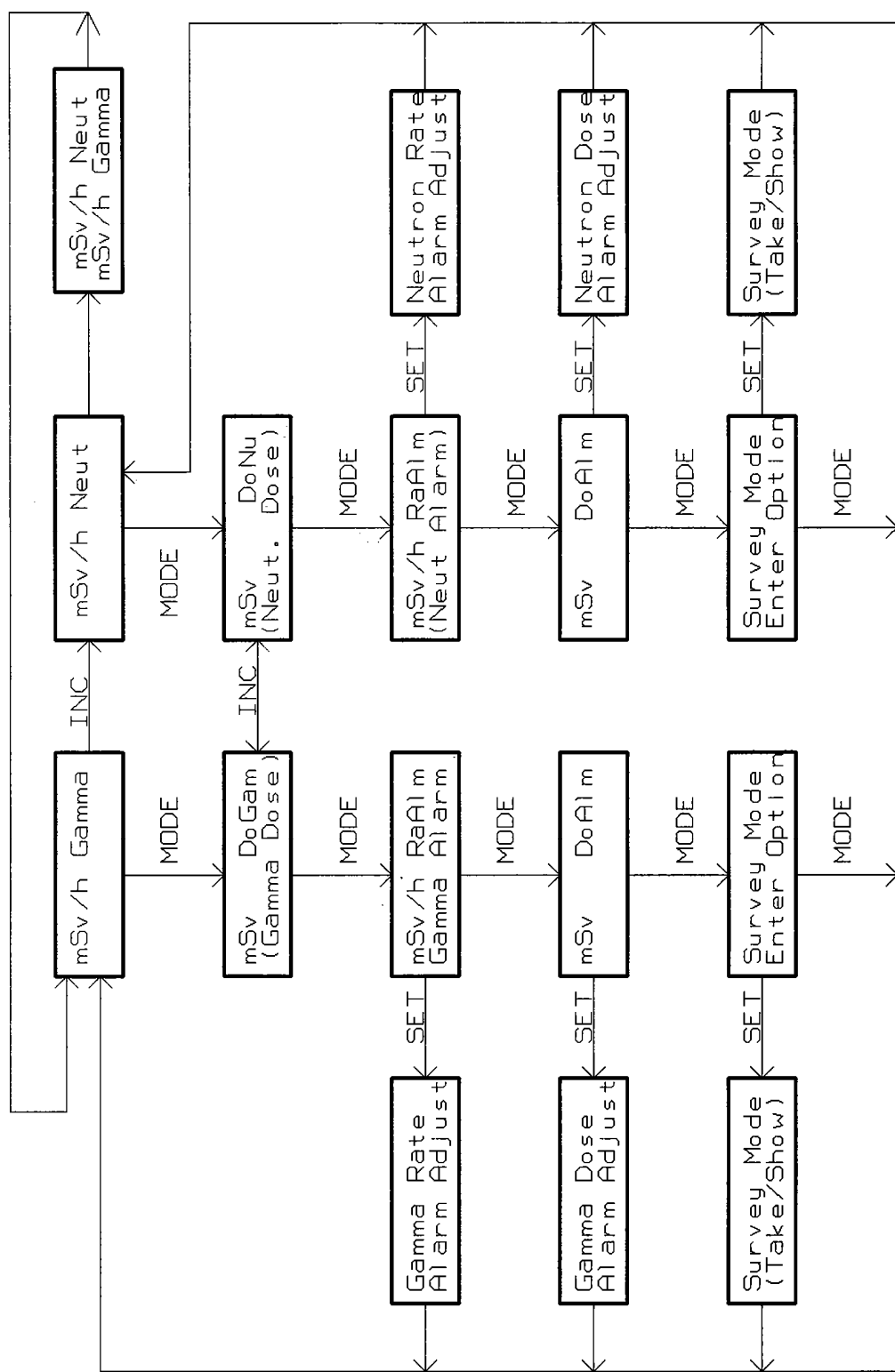


X-Ray Probe XP-100:

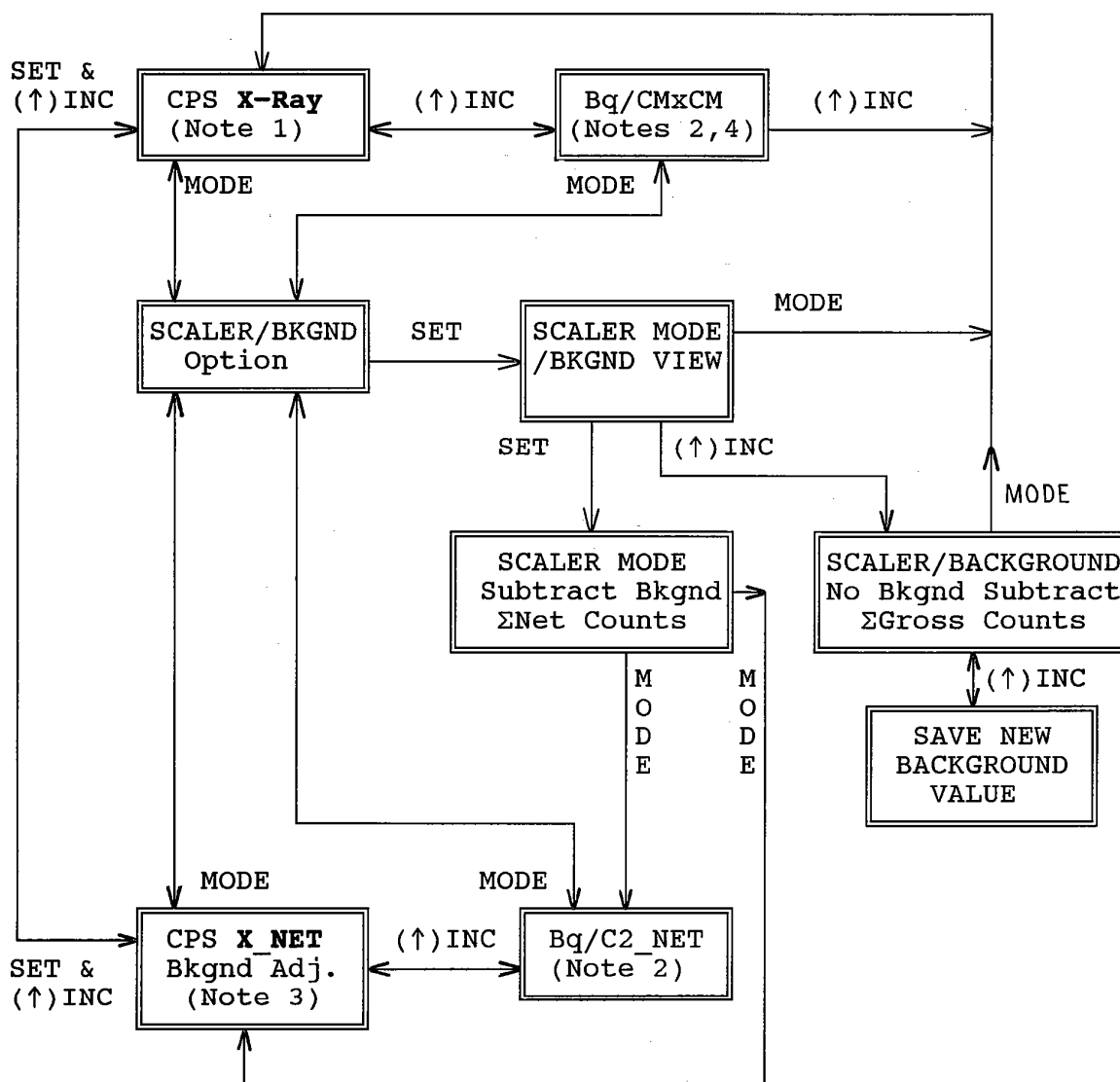


Notes:

1: ADM-300A GM tube reading, low range GM tube only.



X-Ray Probe 5":



NOTES:

1. True count rate, not adjusted.
2. Displayed concentration based based on switch setting (17keV or 60keV), probe scale factor, a distance of one foot from surface, and one year weapon's age.
Weapon's age is not user adjustable.
3. NET rates derived from true rate minus entered background rate.
4. Bq/CMxCM mode not available when probe switch is in "Peak Align" position.
5. Audio "clicks" are for Gross counts, even when Net rate is displayed.